

CALCISABELLA PILOSETA, A NEW GENUS AND SPECIES OF SABELLINAE (POLYCHAETA: SABELLIDAE)

Thomas H. Perkins

ABSTRACT

Calcisabella piloseta, a new genus and species of Sabellinae (Polychaeta: Sabellidae), is described from Lizard Island, Great Barrier Reef, Australia. Most characters of the new species are typical of those in genera of the Sabellinae, but the combination of characters differs from those found in all other Sabellinae genera. The species differs from all Sabellidae in having a calcareous tube and spinose setae.

All previously described species of Sabellidae Johnston, 1846, are characterized by horny, gelatinous, or mucoid tubes, usually variously covered with sediments. This paper describes a new genus and species of the subfamily Sabellinae Johnston, 1846, that has a calcareous tube, a condition previously known only in Serpulidae and one species of Cirratulidae now called *Dodecaceria fewkesi* (Reish, 1952; Berkeley and Berkeley, 1954). Setae of the new species also differ from those known for all other Sabellidae in being spinose rather than hooded (Perkins, 1984).

The concept of the subfamily Sabellinae used here follows the diagnosis provided in the revision, based on cladistic analyses, of the Sabellidae-Caobangiidae-Sabellongidae complex of the order Sabellida by Fitzhugh (1989). In that revision, Fitzhugh clarified characters of the sabellid subfamilies Sabellinae and Fabriciinae Rioja, 1923 (=Amphicorinae Meyer, 1887: 721-723, at tribe rank as "Amphicoriden"; latinized by Benham in 1894; see Benham, 1896: 339); referred Sabellongidae Hartman, 1969, to Sabellinae; and referred Caobangiidae Jones, 1974, to Fabriciinae. Several character states of the new species may be useful in testing the phylogenetic hypotheses of Fitzhugh (1989).

MATERIALS AND METHODS

Specimens are available for study in the following institutions: Australian Museum, Sydney (AM); Florida Marine Research Institute, St. Petersburg, Florida (FSBC I); National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM); and Zoological Museum, University of Amsterdam (ZMUA). Terminology follows that of Perkins (1984). Figures of setae and uncini were drawn with the aid of Zeiss Nomarski interference-contrast optics and a camera lucida. Figures of tubes were done using a Hitachi HHS-2R scanning electron microscope.

Sabellidae Johnston, 1846

Sabellinae Johnston, 1846

Diagnosis.—Branchial lobes fused dorsally, with cartilaginous skeleton joining lobes posterodorsally and extending into radioles and pinnules; radiolar skeletons with two or more cells in cross section. Collar usually present, formed from second peristomial ring. Thoracic uncini beginning on setiger 2, with principal tooth surmounted by numerous small teeth; uncinal bases of three types: (1) short, stout, with breast, without handle; (2) elongate, gently curved, with reduced breast; or (3) bent, altogether Z-shaped, stout, with breast, with handle. Abdominal uncini with dentition of two types: (A) principal tooth surmounted by small teeth; uncinal bases (1) short, stout, with breast, without handle; (2) Z-shaped, stout, with breast, with handle; or (3) bent, somewhat Z-shaped, slender, with handle and reduced breast; or (B) dentate region rasp-shaped, without principal tooth, base short, stout, with breast, without handle (modified from Fitzhugh, 1989).

Calcisabella new genus

Description.—Small, slender Sabellinae with calcareous tube. Tube circular in cross section, coiled, plain, adnate to substrate or with anterior end erect, possibly aggregated, usually with inner part appearing crystalline but with some thin parts apparently formed of grains of calcium carbonate. Branchial crown with five pairs of radioles, with dorsal and ventral lips and parallel lamellae; ventral lips with appendage. Radioles flanged proximally. Thorax separated from abdomen only by inversion of setae and uncini and usually by one or more segments without uncini; thorax with bilobed collar, with glandular regions organized into ventral shields. Abdomen with numerous segments. Pygidium bilobed. Setae of thorax and abdomen similar in shape, slender, spinose, moderately long to very long, on conical lobes, extending from thorax into abdomen in straight, unmodified row. Collar setae similar to those of other thoracic setigers. Lower setae of anterior thoracic segments arranged in transverse bundle, markedly diminishing in length ventrally, markedly diminishing in number on posterior thoracic segments. Abdominal setae similar in number and size to setae of posterior thoracic segments. Uncini similar in thorax and abdomen, with stout base, with breast, without handle, with principal tooth surmounted by numerous small teeth. Thoracic uncini markedly diminishing in number after setiger 3. Companion setae hook-shaped, single, occasionally two per notopodium, beginning on setiger 4 and accompanying thoracic uncini in upper parts of tori. Abdominal tori long, distinctly displaced dorsally, separated dorsally by about length of torus; uncini widely separated from each other. Body-wall musculature thin, very strong, similar to that of Serpulidae.

Type Species.—*Calcisabella piloseta*, designated here.

Etymology.—*Calcisabella* is derived from a combination of the Latin *calcis*, lime, referring to the tube, and the stem name *Sabella*. Gender feminine.

Calcisabella piloseta new species

Figs. 1–3

Type Material.—Australia, Great Barrier Reef, Lizard Island, lagoon near E entrance, sheltered side of reef, from just above sandy bottom to near surface, 20–2 m, H.A. ten Hove, collector, 3–4 March 1986, holotype (AM W20111); 16+ paratypes (AM W20112, FSBC I 37306, USNM 125894, ZMUA tH744); same, Lizard Island, Granite Head, subtidal, on rock, from undersides of boulders, 18 June 1983, 1 + fragments, paratypes (USNM 125895).

Additional Description.—Radioles in cross section with 4 skeletal cells proximally, cells diminishing in number distally to single cell in tips; flanges extending for about $\frac{1}{4}$ length of radioles; radiole tips filiform, about as long as pinnulate parts. Pinnules short proximally, long distally. Anterodorsal surface of anterior peristomial ring formed of long, narrow columnar cells. Internal eyespots usually present laterally in peristomium. Collar beginning ventral to collar setae, incised ventrally; lamellae long ventrally, round-tipped. Setal lobes of collar segment with broad anterior lamellae and distoposterior ligules; ligules also present on other thoracic notopodial lobes, diminishing in size posteriorly. Thorax with 11–15 segments, indicated posteriorly only by few uncini and companion setae, or one or more segments at posterior end of thorax bearing only setae. Ventral surface of collar segment and anterior part of setiger 2 completely glandular; glandular areas organized into ventral shields by setiger 3, divided medially beginning on setiger 4, diminishing in size and thickness on following segments, with no distinct change at junction of thorax and abdomen. Setae of setiger 2 consisting of upper row of about four very long setae and generally transverse bundle of 8–10 setae below;

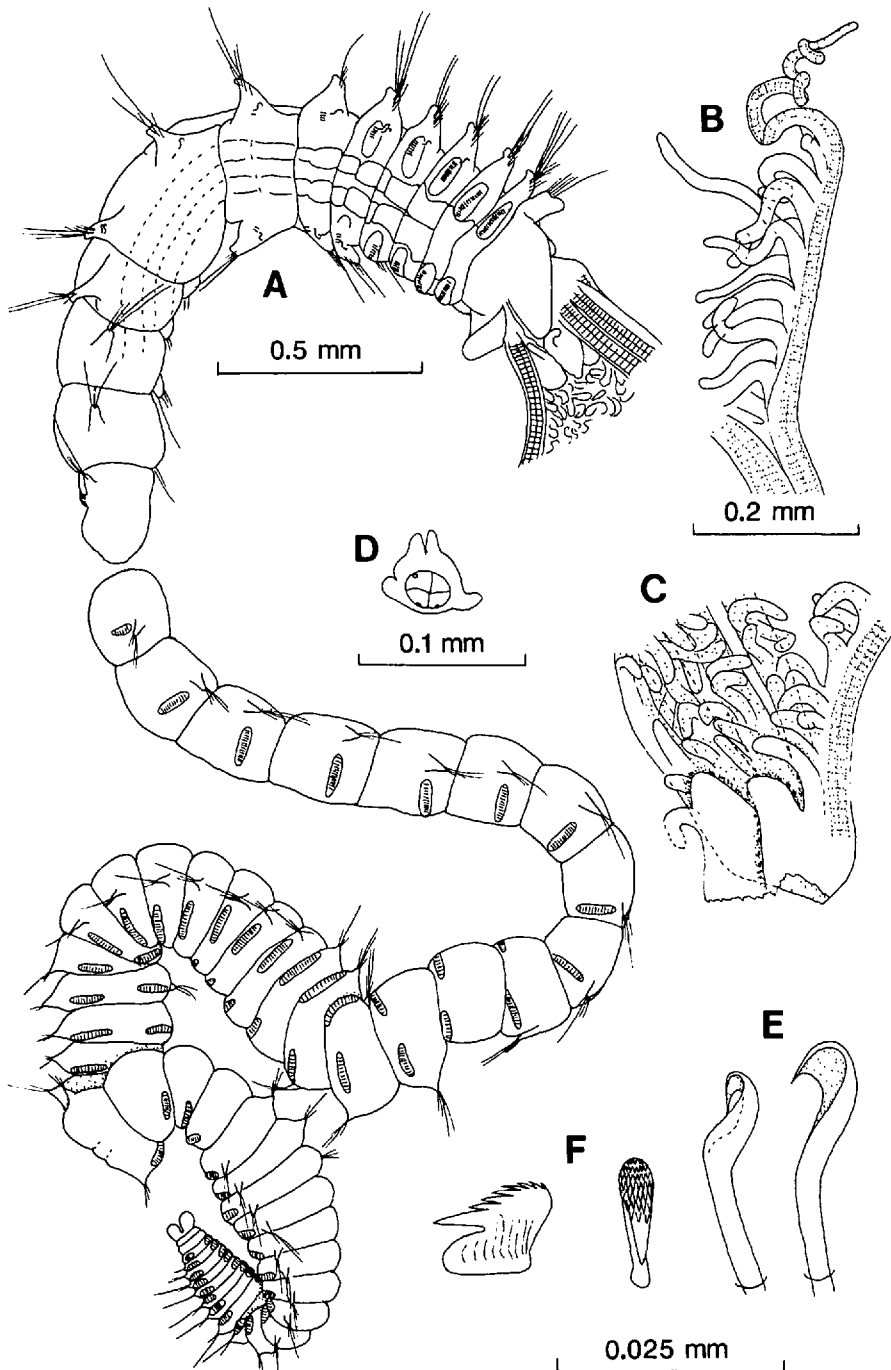


Figure 1. *Calcisabella piloseta* new species: A, body, ventral view of thorax; B, second dorsal radiole, right branchial lobe; C, proximal part of right branchial lobe, medial view; D, cross section near proximal end of radiole; E, companion setae of setigers 4 and 5, different views; F, thoracic uncini of setiger 2, profile and face views (A, holotype; B-F, paratype, FSBC I 37306).

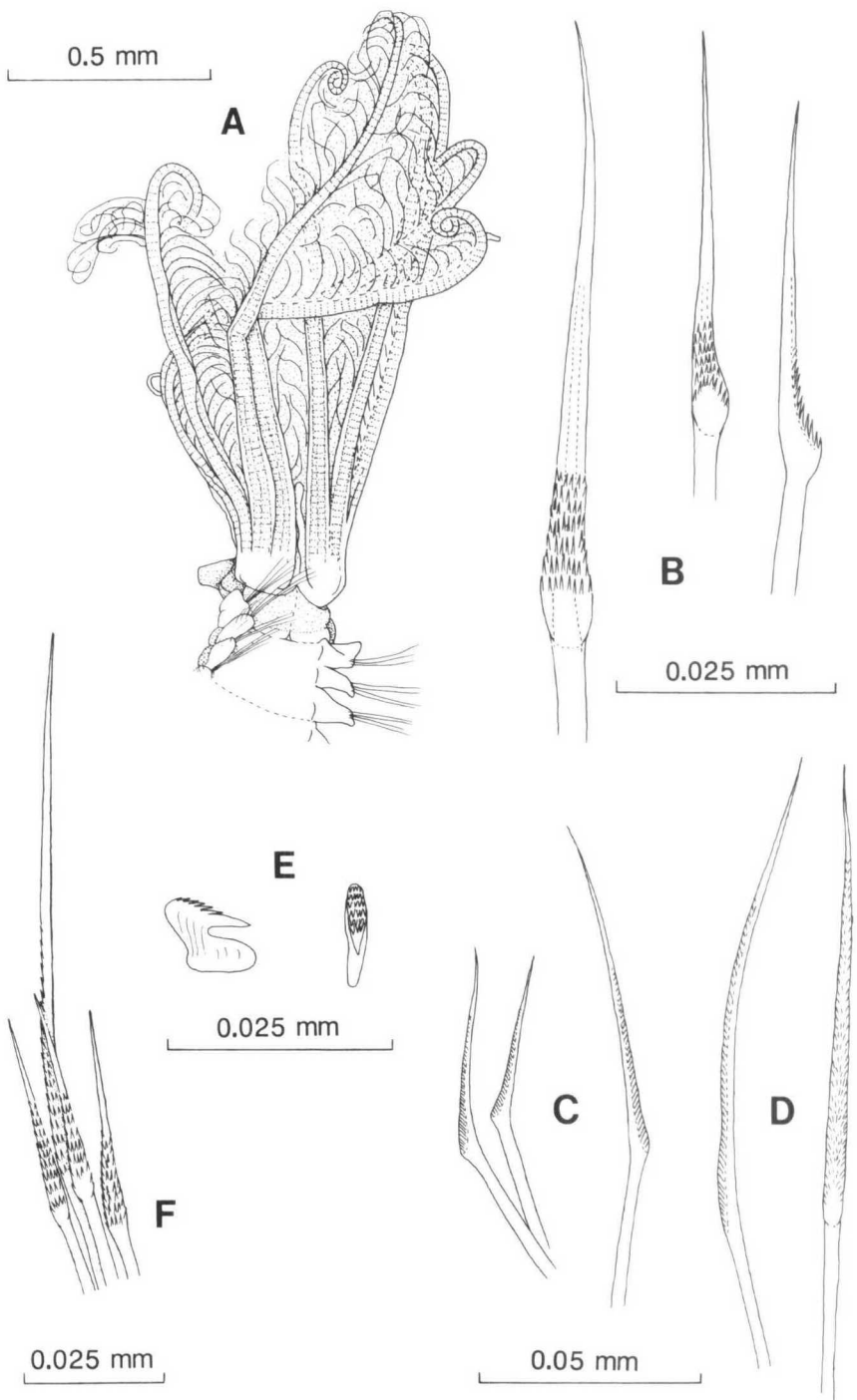


Figure 2. *Calcisabella piloseta* new species: A, branchial crown and anterior part of thorax, dorsal view; B, lower thoracic setae, setiger 4; C, same, another specimen; D, upper thoracic setae of specimen in C; E, abdominal uncini, middle segment, profile and face views; F, abdominal setae, middle segment (A, holotype; B-F, paratypes, FSBC I 37306).

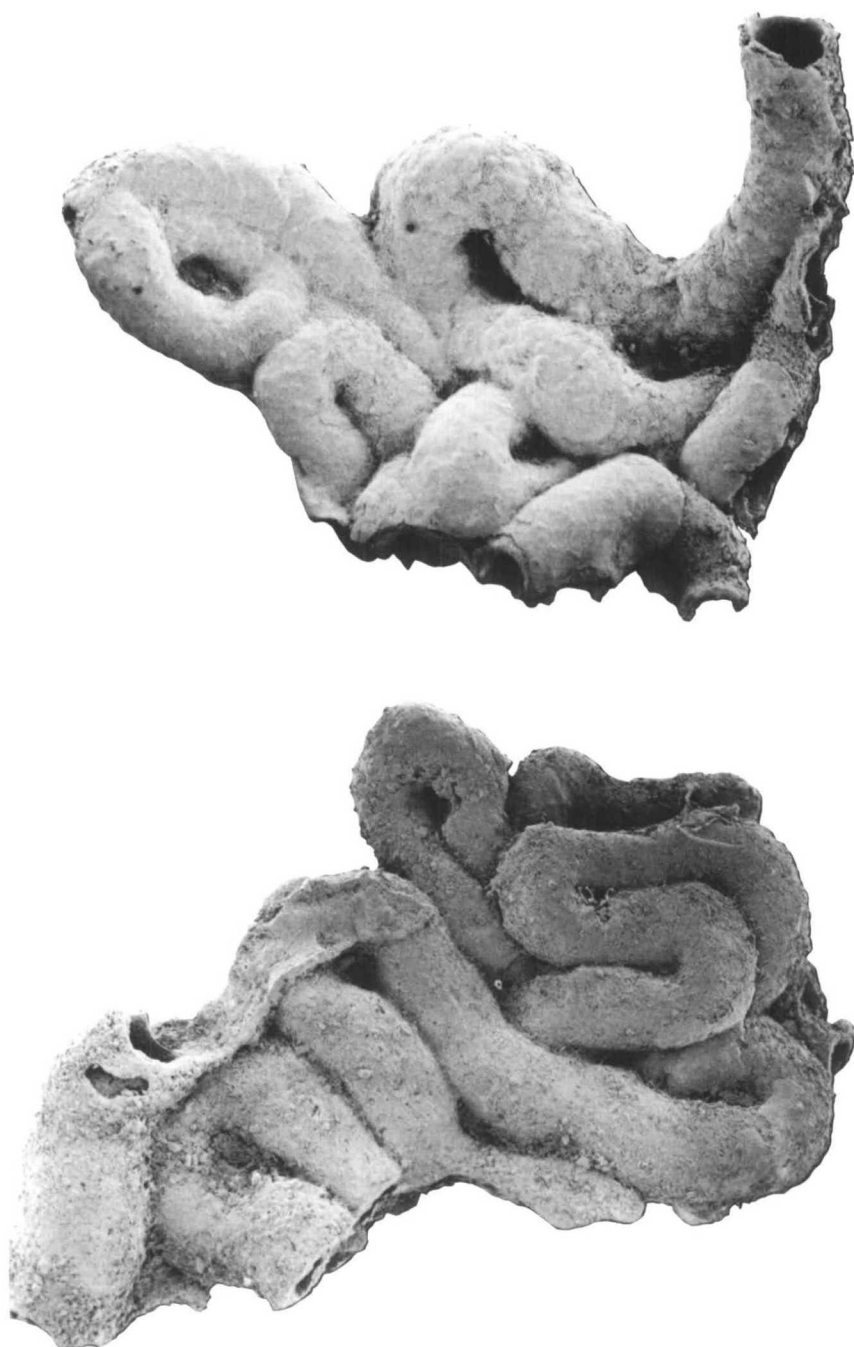


Figure 3. *Calcisabella piloseta* new species: Calcareous tubes of paratypes (FSBC I 37306) (greatest dimensions of both tube masses = 4.9 mm).

shortest lower setae almost $\frac{1}{2}$ length of upper setae; posterior thoracic segments with two to three long setae and four to five short setae. Thoracic uncini numbering up to 25 in tori of setigers 2 and 3, diminishing in number to single uncinus in neuropodia by setiger 8. Abdomen beginning at setiger 12–16; middle segments

having one to two very long setae, and 3 to 4 setae similar in shape but about $\frac{1}{2}$ as long; uncini numbering 12–14 in tori of anterior segments, diminishing in number near posterior end.

Etymology.—The species name, *pilosea*, is derived from a combination of the Greek *pilos*, hair, and the Latin *seta*, bristle, and refers to the spinose setae of the species.

Remarks.—A few specimens of *Calcisabella* sp. from the type locality (USNM 125893) are a little more robust than specimens of *C. pilosea* and do not have companion setae.

DISCUSSION

The suite of generic characters of *Calcisabella* does not resemble that of any other genus, and its placement in Sabellinae is problematical. Several of the characters, e.g., the calcareous tube, spinose setae, hook-shaped companion setae, and lack of a distinct separation of the thorax and abdomen, may be primitive, autapomorphic character states that evolved after the separation of the sabellid and serpulid lines, or a combination of primitive and autapomorphic characters.

The characters and character states developed by Fitzhugh (1989) were used to formulate a more definite hypothesis on the placement of the new genus in the Sabellida. The spinose setae of *Calcisabella* were added as a new character state. Character states were then integrated into Fitzhugh's character matrix for all Sabellidae genera, except for *Sabellonga* Hartman, 1969, and analyzed by Fitzhugh using the option *mhennig*¹ in combination with the option *bb*¹ of the phylogenetic systematics program *Hennig86*: version 1.5. A Nelson consensus tree for the 142 equal-length cladograms developed using these procedures placed *Calcisabella* in an eight-group polycotomy in the clade of Sabellinae genera (as revised by Fitzhugh) for which companion setae are a synapomorphy (examples include *Potamethus* Chamberlin, 1919, the *Notaulax* group, and the *Potamilla* group). For a definitive hypothesis of the phylogeny of the group, see Fitzhugh (1989). However, the analysis of Fitzhugh included neither the calcareous tube, the reduced number and shape of companion setae, nor the indistinct separation of the thorax and abdomen, characters of *Calcisabella* that differ from those of all other genera of Sabellinae. Further analysis may provide more definite hypotheses of the importance of these characters, but at this time, these characters and the spinose setae are assumed to be autapomorphies not informative as to the phylogeny of the animal.

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ADDRESS: Florida Marine Research Institute, 100 Eighth Avenue S.E., St. Petersburg, Florida 33701-5095.